Date: Mon, 1 Nov 93 04:30:47 PST
From: Ham-Space Mailing List and Newsgroup <ham-space@ucsd.edu>
Errors-To: Ham-Space-Errors@UCSD.Edu
Reply-To: Ham-Space@UCSD.Edu
Precedence: Bulk
Subject: Ham-Space Digest V93 #73
To: Ham-Space

Ham-Space Digest   Mon, 1 Nov 93   Volume 93 : Issue   73

Today's Topics:

Send Replies or notes for publication to: <Ham-Space@UCSD.Edu>
Send subscription requests to: <Ham-Space-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Space Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-space".

We trust that readers are intelligent enough to realize that all text
herein consists of personal comments and does not represent the official
policies or positions of any party. Your mileage may vary. So there.

Date: Fri, 29 Oct 1993 10:33:12 MDT
From: elroy.jpl.nasa.gov!usc!math.ohio-state.edu!cyber2.cyberstore.ca!
nntp.cs.ubc.ca!alberta!nebulus!ve6mgs!usenet@ames.arpa
Subject: * SpaceNews 01-Nov-93 *
To: ham-space@ucsd.edu

SB NEWS @ AMSAT $SPC1101
* SpaceNews 01-Nov-93 *

BID: $SPC1101

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SpaceNews
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MONDAY NOVEMBER 1, 1993

SpaceNews originates at KD2BD in Wall Township, New Jersey, USA. It is published every week and is made available for unlimited distribution.

* STS-58 SAREX NEWS *

The latest in a series of Shuttle Amateur Radio Experiments carried onboard Space Shuttle "Columbia" has been a great success. The Shuttle astronauts managed to make scheduled radio contacts with school groups as well as general contacts with amateur radio operators around the world.

The following packet beacon was sent by Space Shuttle "Columbia" on 25-Oct-93 at 15:14:03 UTC and received by N2NRD:

Thanks for all the great QSO's. KC5AXA, KC5CKM, and I love them.
We're half way through the mission, beginning flight day 8 today.
We are doing human metabolic and cardiovascular experiments in the lab today.
We will also continue with an experiment to quantify the impact human activity in a space ship on the microgravity environment.
We have had spectacular views of our beautiful home planet.
We hope to bring back a large quantity of pictures.
73
KC5ACR

* MIR OPERATING HINTS *

This week: Digipeating through MIR

As some have discovered, it is possible to digipeat though the MIR packet station and use it to connect to other packet stations hundreds of miles away. Unfortunately, the data throughput is pitifully small. WF1F in Billerica, Massachusettes ran a test with Joe WA2GSY in New Jersey. Both stations ran 20 foot 2-meter Yagis with an ERP of approximately 1200 watts. Late one weekday evening, both stations were fortunate enough to find the MIR PBBS with no users on frequency. This is an extremely rare condition. Both stations attempted to directly connect to each other using MIR as a digipeater, and were successful. Every line of text that was sent to each other made it through without error. However, because of retries, acknowledgments, and other packet related overhead, the 120 character per second transmissions were reduced to approximately 1 character for every 2.5 seconds.

The following short message took 4 minutes and 37 seconds to transfer through Mir, and required over 132 packet transmissions. There were probably many

more transmissions, but the equipment was not set up to count any packet collisions at either end.

```
CONNECTED to WA2GSY VIA R2MIR [04/18/93  00:25:00]
WA2GSY>:PLEASE CONNECT TO WA2GSY-1 FOR MY PMS
WA2GSY>:Hi miles
WF1F>:HI JOE GOT YOU
WA2GSY>:How are you
WA2GSY>:Glad to see you on
WA2GSY>:Whats up
WA2GSY>:Sure is happy to hear you
WF1F>LETS TRY OSCAR 13 OR SSB
WA2GSY>:Did you get the equip fixed
WA2GSY>:*** DISCONNECTED [04/18/93  00:29:37]
```

Now for the statistics:

```
Packets from WF1F to WA2GSY through MIR: 31
Packets from WA2GSY to WF1F through MIR: 35

Total time 4:37
Total characters sent by WF1F:   39
Total characters sent by WA2GSY: 110
```

Throughput would further be reduced if there were ground stations trying to connect to the PBBS on MIR while other stations used MIR for digipeating purposes. The bottom line is that digipeating through MIR is NOT recommended while others are actively connected to the MIR PBBS. Even under ideal conditions with high ERP, it is not possible to get much data though MIR acting as a digipeater.

Remember, only 1 station can connect to MIR's PBBS at a time. All others must wait.

G. Miles Mann
WF1F @ K1UGM.MA
mann@pictel.com

[Story by G. Miles Mann, WF1F]

* ITAMSAT-OSCAR-26 NEWS *

Sunday October 24th 1993 marked a very important day for ITAMSAT-OSCAR 26. After 28 days in orbit, IO-26 BBS was up and running, and has been accessed by many amateurs around the world.

The initial reports are very encouraging. Even at this low power setting,

around 250 mW, the PSK signal is crystal clear and decoding is very easy.

LW2DTZ copied the following beacon frames from the satellite:

ITMSAT-1>TIME-1
PHT: uptime is 021/04:11:44. Time is Sun Oct 24 13:42:57 1993

ITMSAT-1>AMSAT
24 October 1993 - BBS open to users.
Use standard PB and PG software.
73 de ITAMSAT Command Team

Activity on the BBS has just started, but we have already received many enthusiatic comments. Ground stations that had accessed the BBS as of 24-Oct-93 included: I0LYL (which we thank for his kind words), I6CGE, IK2OYD, IK2VOO, IW2EGC, IW4ASO, DL1TV, EA2CLS, OE3EV, ON6UG, WB5FCO and ZS6BMN.

As always, we are waiting for any report from amateurs around the globe!

73 de ITAMSAT Command Team

[Info via Luca Bertagnolio, IK2OVV]

* VE3ONT EME OPERATION NEWS *

The Toronto VHF Society plans to continue its EME (Moonbounce) tests using the 46-meter (150') dish at the Algonquin Provincial Park, Ontario. Operation will be as follows:

Date (UTC)	VE3ONT TX Freq	RX Freq	Approx. time (UTC)
Saturday, Nov. 6	432.050	432.050-060	0405-1645
Sunday, Nov. 7	1296.050	1296.050-060	0515-1715

The dish can be lowered to about 9 degrees elevation. This decreases the operating time by almost an hour at Moon rise and set. It also limits the ability to work local horizon-only stations.

Equipment: The 432 MHz setup will be significantly better than October's. The receive problem that gave all signals a 120 Hz buzz has been fixed, and the antenna will have about 1 dB more antenna gain due to a redesigned feed helix.

On 1296, VE6ONT will be running about 150 watts output. The feed will be LHCP/RHCP switchable so they ought to be able to work linear and circular polarization stations.

VE6ONT anticipates being able to work stations running 50-100 watts to a long yagi on 432 or 1296. OSCAR-class stations are especially encouraged to try.

Operating suggestions:

Doppler shift will move the apparent VE3ONT frequency a bit. This will make VE3ONT seem to be a little "off frequency," so tune around. Moon echos will seem to be somewhat high (in frequency) at Moonrise and low at Moonset. We will, however, always transmit on .050.

Note that VE6ONT will be operating "split" so please spread out. In the October operation, some stations were frustrated due to calling VE6ONT on their own frequency, where they weren't listening. Try to use good split-frequency HF DXing technique: listen for the stations that VE3ONT is calling and transmit near their frequency when VE3ONT stands by.

Please avoid duplicate QSOs. The goal is to be "first EME" for as many small stations as possible. "Calling again to say Hi" hurts small stations' chances of making a QSO.

VE3ONT will be operating in "contest" mode. They discovered last month that sequenced operation was not fruitful. They will make every effort to work small and horizon-only stations but will not accept skeds.

HF Liaison: HF propagation from the park is extremely poor. VE6ONT will try to check in to the 20-meter (14.345) EME Net during the day and the 75-meter VHF nets (3.818 & 3.843) at night. Previous attempts to do so were not successful, so don't expect much on HF.

QSL information: QSL to VE3ONT ('93 Callbook address ONLY!) or to Dennis Mungham (VE3ASO), R.R. 3, Mountain, Ontario, Canada K0E 1S0. Color photo QSLs are being prepared.

Michael Owen, W9IP
MOWE@SLUMUS
Fax: (315) 379-5804
Dennis Mungham, VE3ASO

[Info via W9IP]

* THANKS! *
==========
Thanks to all those who sent messages of appreciation regarding SpaceNews, especially:

G0JJO IW1CXZ N8OAR

* FEEDBACK/INPUT WELCOMED *
==========
Mail to SpaceNews should be directed to the editor (John, KD2BD) via any
of the following paths:

FAX   : 1-908-747-7107
PACKET   : KD2BD @ N2KZH.NJ.USA.NA
INTERNET : kd2bd@ka2qhd.ocpt.ccur.com -or- kd2bd@amsat.org

MAIL   : John A. Magliacane, KD2BD
           Department of Engineering and Technology
           Advanced Technology Center
           Brookdale Community College
           Lincroft, New Jersey 07738
           U.S.A.

       <<=- SpaceNews: The first amateur newsletter read in space! -=>>

/EX

--
John A. Magliacane, KD2BD   * /\/\ * Voice   : 1-908-224-2948
Advanced Technology Center |/\/\/\| Packet : KD2BD @ N2KZH.NJ.USA.NA
Brookdale Community College |\/\/\/| Internet: kd2bd@ka2qhd.ocpt.ccur.com
Lincroft, NJ 07738   * \/\/ * Morse   : -.- -.. ..--- -... -..

Date: 31 Oct 93 22:56:44
From: news.larc.nasa.gov!larry.larc.nasa.gov!partos@ames.arpa
Subject: RS-12/13's other name??
To: ham-space@ucsd.edu

RS 12/13 is Norad# 21089 and is also known as Cosmos 2123.
--
|---|
| Richard D. Partos   KE4AZJ   Norfolk, VA |
Internet: r.d.partos@larc.nasa.gov

Date: Thu, 28 Oct 1993 13:00:00 MDT
From: sdd.hp.com!spool.mu.edu!sol.ctr.columbia.edu!math.ohio-state.edu!
cyber2.cyberstore.ca!nntp.cs.ubc.ca!alberta!nebulus!ve6mgs!usenet@network.ucsd.edu

Subject: SAREX Keps & Update 10/28
To: ham-space@ucsd.edu

SB SAREX @ AMSAT $STS-58.025
SAREX Keps & Update: 10/28

Thursday 10/28/93 @ 08:00 UTC

The last school group contact was completed yesterday. The Portsmouth HS in Portsmouth, New Hampshire had a telebridge contact using stations in California (Ralph Warner, N6MNN) and Texas (Bob Douglas, W5GEL). The students asked 5 questions during this bridge contact.

Hams across the U.S. and around the world continue to work the Shuttle Columbia on both voice and packet. Moreover, the completion of school group contacts has cleared several school backup passes for possible general QSO opportunities. While the SAREX Working Group cannot fully guarantee availability, there is a high probability that the STS-58 crew will be ready to take general calls over the continental U.S. on these passes. Two of these "scheduled" passes remain. These include orbit 178 at MET 11 days 1 hour 42 minutes (10/29 at 16:35 UTC) and orbit 192 at MET 11 days 22 hours and 29 minutes (10/30 at 13:22 UTC). Please note that the astronauts operated voice during yesterday's "scheduled" pass which occurred on 10/27 at 14:59 UTC (Orbit 145). Also note that hams on the ground heard or worked the Shuttle Columbia crew on several other orbits yesterday.

Element set GSFC-031, generated by Ron Parise, WA4SIR, is the official SAREX set for today. Please note that there is only a six second difference between element set GSFC-025 (released two days ago) and element set GSFC-031.

```
 STS-58
 1 22869U 93065A   93300.17699070 0.00133671  99048-5  24183-3 0   318
 2 22869  39.0252  71.9896 0012817  34.2105 325.9529 16.00500857  1383

 Satellite: STS-58
 Catalog number: 22869
 Epoch time:      93300.17699070         (27 OCT 93   04:14:51.** UTC)
 Element set:     GSFC-031
 Inclination:       39.0252 deg
 RA of node:        71.9896 deg          Space Shuttle Flight STS-58
 Eccentricity:    0.0012817                  Keplerian Elements
 Arg of perigee:    34.2105 deg
 Mean anomaly:     325.9529 deg
 Mean motion:   16.00500857 rev/day      Semi-major Axis: 6651.1630 Km
 Decay rate:       0.13E-02 rev/day*2    Apogee  Alt:        281.30 Km
 Epoch rev:             138              Perigee Alt:        264.25 Km
```

NOTE - This element set is based on NORAD element set # 031.
The spacecraft has been propagated to the next ascending
node, and the orbit number has been adjusted to bring it
into agreement with the NASA numbering convention.

Submitted by Frank H. Bauer, KA3HDO for the SAREX Working Group
/EX

Date: Thu, 28 Oct 1993 19:35:51 MDT
From: sdd.hp.com!spool.mu.edu!sol.ctr.columbia.edu!math.ohio-state.edu!
cyber2.cyberstore.ca!nntp.cs.ubc.ca!alberta!nebulus!ve6mgs!usenet@network.ucsd.edu
Subject: SAREX Keps & Update 10/28
To: ham-space@ucsd.edu

SB SAREX @ AMSAT $STS-58.026
SAREX Keps & Update 10/28

Thursday 10/29/93 @ 01:00 UTC

All scheduled SAREX school and personal contacts are complete. This mission was, by far, the most successful from a school group success standpoint. Only 2 school group and 1 personal contacts had to be repeated. The probability of a successful school contact on the first attempt was nearly 90% for this mission. During previous missions, our success rate was between 66-75% The majority of the schools had horizon to horizon contacts and many schools had 10 or more questions answered. The SAREX Working Group wishes to thank the school group volunteers for their outstanding efforts, the AMSAT technical mentors who coached the schools prior to the contact, and those who helped in the Mission Control Customer Support room; particularly John Nickel, WD5EEV, and Karen Nickel, WD5EEU.

Because all scheduled SAREX activities are now complete, several additional general QSO opportunities are now available. While the SAREX Working Group cannot fully guarantee that the crew will be operating, there is a high probability that the STS-58 astronauts will be ready to take general calls over the continental U.S. on these passes. A total of FOUR "scheduled" passes are now available. The two mentioned in previous bulletins include orbit 178 at MET 11 days 1 hour 42 minutes (10/29 at 16:35 UTC) and orbit 192 at MET 11 days 22 hours and 29 minutes (10/30 at 13:22 UTC). In addition, two other "scheduled" passes are now available. These include a pass on orbit 176 at MET 10 days 22 hours 18 minutes (10/28 at 13:11 UTC) and a pass on orbit 193 at MET 12 days 0 hours 6 minutes (10/30 at 14:49 UTC). Please note that many hams on the ground heard or worked the Shuttle Columbia crew on several orbits today.

Element set GSFC-031, generated by Ron Parise, WA4SIR, will continue to be
the official SAREX element set. When last checked by Gil Carman, WA5NOM,
there was less than a one second difference between the orbiter state vector
and element set GSFC-031.

```
 STS-58
 1 22869U 93065A   93300.17699070 0.00133671  99048-5  24183-3 0   318
 2 22869  39.0252  71.9896 0012817  34.2105 325.9529 16.00500857  1383

 Satellite: STS-58
 Catalog number: 22869
 Epoch time:      93300.17699070         (27 OCT 93   04:14:51.** UTC)
 Element set:     GSFC-031
 Inclination:       39.0252 deg
 RA of node:        71.9896 deg          Space Shuttle Flight STS-58
 Eccentricity:    0.0012817                  Keplerian Elements
 Arg of perigee:    34.2105 deg
 Mean anomaly:     325.9529 deg
 Mean motion:   16.00500857 rev/day      Semi-major Axis: 6651.1630 Km
 Decay rate:       0.13E-02 rev/day*2    Apogee  Alt:        281.30 Km
 Epoch rev:             138              Perigee Alt:        264.25 Km


 NOTE - This element set is based on NORAD element set # 031.
        The spacecraft has been propagated to the next ascending
        node, and the orbit number has been adjusted to bring it
        into agreement with the NASA numbering convention.
```

Submitted by Frank H. Bauer, KA3HDO for the SAREX Working Group

/EX

Date: Fri, 29 Oct 1993 18:26:43 MDT
From: sdd.hp.com!spool.mu.edu!uwm.edu!math.ohio-state.edu!cyber2.cyberstore.ca!
nntp.cs.ubc.ca!alberta!nebulus!ve6mgs!usenet@network.ucsd.edu
Subject: SAREX Keps & Update 10/30
To: ham-space@ucsd.edu

SB SAREX @ AMSAT $STS-58.031
SAREX Keps & Update 10/30

Saturday 10/30/93 @ 00:00 UTC

Since all scheduled SAREX activities are now complete, several general
QSO opportunities are available. While the SAREX Working Group cannot

fully guarantee that the crew will be operating, there is a high probability that the STS-58 astronauts will be ready to take general calls over the continental U.S. on these passes. These opportunities include a pass on orbit 192 at MET 11 days 22 hours and 29 minutes (10/30 at 13:22 UTC) and a pass on orbit 193 at MET 12 days 0 hours 6 minutes (10/30 at 14:49 UTC). Please note that many hams on the ground heard or worked the Shuttle Columbia crew on several orbits today. Both voice and packet modes were operating.

Element set GSFC-031, generated by Ron Parise, WA4SIR, will continue to be the official SAREX element set for today. On orbit 181 Gil Carman, WA5NOM, of the Johnson Space Center compared the orbiter state vector to GSFC-031. The state vector was 6 seconds later than this element set. Other later element sets (e.g. GSFC-038) are currently less accurate than GSFC-031.

```
 STS-58
 1 22869U 93065A   93300.17699070 0.00133671  99048-5  24183-3 0   318
 2 22869  39.0252  71.9896 0012817  34.2105 325.9529 16.00500857  1383

 Satellite: STS-58
 Catalog number: 22869
 Epoch time:      93300.17699070         (27 OCT 93   04:14:51.** UTC)
 Element set:     GSFC-031
 Inclination:       39.0252 deg
 RA of node:        71.9896 deg          Space Shuttle Flight STS-58
 Eccentricity:    0.0012817                  Keplerian Elements
 Arg of perigee:    34.2105 deg
 Mean anomaly:     325.9529 deg
 Mean motion:   16.00500857 rev/day      Semi-major Axis: 6651.1630 Km
 Decay rate:       0.13E-02 rev/day*2    Apogee  Alt:        281.30 Km
 Epoch rev:             138              Perigee Alt:        264.25 Km


 NOTE - This element set is based on NORAD element set # 031.
        The spacecraft has been propagated to the next ascending
        node, and the orbit number has been adjusted to bring it
        into agreement with the NASA numbering convention.
```

Submitted by Frank H. Bauer, KA3HDO for the SAREX Working Group

/EX

Date: Sat, 30 Oct 1993 11:06:11 -0600
From: swrinde!cs.utexas.edu!math.ohio-state.edu!cyber2.cyberstore.ca!
nntp.cs.ubc.ca!alberta!nebulus!ve6mgs!usenet@network.ucsd.edu
Subject: SAREX Keps/Update 10/30
To: ham-space@ucsd.edu

SB SAREX @ AMSAT $STS-58.032
SAREX Keps/Update 10/30

Saturday 10/30/93 @ 17:00 UTC

We have recently learned that SAREX will remain active on the Space Shuttle Columbia until 16:53 UTC on October 31. KC5ACR, (Bill McArthur) KC5AXA (Marty Fettman) and KC5CKM (Rick Searfoss) will continue voice operations today and tomorrow as time permits. Also, the packet robot system, using the callsign W5RRR-1, should be operational when the STS-58 crew is busy doing science investigations. Good luck!

Element set GSFC-031, generated by Ron Parise, WA4SIR, will continue to be the official SAREX element set for today. On orbit 191 Gil Carman, WA5NOM, of the Johnson Space Center compared the orbiter state vector to GSFC-031. The state vector was 4 seconds later than this element set.

```
 STS-58
 1 22869U 93065A   93300.17699070 0.00133671  99048-5  24183-3 0   318
 2 22869  39.0252  71.9896 0012817  34.2105 325.9529 16.00500857  1383

 Satellite: STS-58
 Catalog number: 22869
 Epoch time:      93300.17699070         (27 OCT 93   04:14:51.** UTC)
 Element set:     GSFC-031
 Inclination:       39.0252 deg
 RA of node:        71.9896 deg          Space Shuttle Flight STS-58
 Eccentricity:    0.0012817                  Keplerian Elements
 Arg of perigee:    34.2105 deg
 Mean anomaly:     325.9529 deg
 Mean motion:   16.00500857 rev/day      Semi-major Axis: 6651.1630 Km
 Decay rate:       0.13E-02 rev/day*2    Apogee  Alt:        281.30 Km
 Epoch rev:             138              Perigee Alt:        264.25 Km


 NOTE - This element set is based on NORAD element set # 031.
        The spacecraft has been propagated to the next ascending
        node, and the orbit number has been adjusted to bring it
        into agreement with the NASA numbering convention.
```

Submitted by Frank H. Bauer, KA3HDO for the SAREX Working Group

/EX

Date: Mon, 25 Oct 1993 16:35:00 MDT

From: sdd.hp.com!spool.mu.edu!sol.ctr.columbia.edu!math.ohio-state.edu!
cyber2.cyberstore.ca!nntp.cs.ubc.ca!alberta!nebulus!ve6mgs!usenet@network.ucsd.edu
Subject: STS-58 Keps (Orbit 58)
To: ham-space@ucsd.edu

STS-58 Keps (Orbit 58)

STS-58 element set JSC-010 (orbit 53)

```
STS-58
1 22869U 93 65  A 93294.86836529  .00191327  00000-0  25999-3 0   108
2 22869  39.0211 107.4394 0004523 319.1598  40.8836 15.96428488   535

Satellite: STS-58
Catalog number: 22869
Epoch time:      93294.86836529   =    (21 OCT 93   20:50:26.76 UTC)
Element set:     010
Inclination: 39.0211 deg
RA of node:       107.4394 deg           Space Shuttle Flight STS-58
Eccentricity: .0004523              Keplerian Element set JSC-010
Arg of perigee:   319.1598 deg          from NASA flight Day 4 vector
Mean anomaly:      40.8836 deg
Mean motion:   15.96428488 rev/day              G. L. Carman
Decay rate:    1.91327e-03 rev/day~2      NASA Johnson Space Center
Epoch rev:              53
Checksum: 331
```

G.L.CARMAN

********** STS-58 STATE VECTOR**********

FLIGHT DAY 5 STATE VECTORS
ON ORBIT OPERATIONS
(Posted 10/22/93 by Roger Simpson)

The following vector for the flight of STS-58 is provided by NASA Johnson Space Center, Flight Design and Dynamics Division for use in ground track plotting programs. The vector represents the trajectory of Columbia during on orbit operations.

Lift off Time : 1993/291/14:53:09.974
Lift off Date : 10/18/93

Vector Time (GMT) : 295/14:00:00.00
Vector Time (MET) : 003/23:06:50.030
Orbit Count : 64

Weight : 242925.0 LBS
Drag Coefficient : 2.00
Drag Area : 3000.0 SQ FT

M50 Elements			Keplerian Elements		
X =	-2637440.4	FT	A =	3600.1079	NM
Y =	-20942782.5	FT	E =	0.001033	
Z =	5675641.8	FT	I (M50) =	39.27150	DEG
Xdot =	19697.390013	FT/S	Wp (M50) =	113.55002	DEG
Ydot =	-6469.479637	FT/S	RAAN (M50) =	102.02088	DEG
Zdot =	-14650.898454	FT/S	N (True) =	42.23202	DEG
		Anomalies	M (Mean) =	42.15251	DEG
			Ha =	155.421	NM
			Hp =	150.294	NM

Mean of 1950 (M50) Coordinate System : Inertial, right-handed Cartesian system whose origin is the center of the earth. The epoch is the beginning of the Besselian year 1950.
X axis: Mean vernal equinox of epoch
Z axis: Earth's mean rotational axis of epoch
Y axis: Completes right-hand system

A: Semi-major axis
E: Eccentricity
I: Inclination
Wp: Argument of perigee
RAAN: Right ascension of ascending node
N: True anomaly
M: Mean anomaly
Ha: Height of apogee
Hp: Height of perigee

Columbia will perform a 14 fps retrograde orbit adjust maneuver at 5/06:50 MET. The next state vector update will be performed after this maneuver has been completed.

Questions regarding these postings may be addressed to Roger Simpson, Mail Code DM4, L. B. J. Space Center, Houston, Texas 77058,

POSTED BY SSTICH AT VMSPFHOU ON VMSPFHOU.VMBOARDS:PAONEWS

Ron Pogue (KD9QB) Primary Internet Address: a66rmp%andv02@gmr.com
CIS: 71036,1001 AMSAT Internet Address: kd9qb@AmSat.org
Fax: 1-317-773-1463 (24Hrs) Alternate Internet Address: rpogue@gmr.com
Home: 1-317-773-4936 (7-9PM EST) Packet Address: kd9qb@wj9u.in.usa.na

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End of Ham-Space Digest V93 #73
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